



July 28, 2004

U. S. Army Engineer District, Nashville
ATTN: CELRN-EP-R-M (Linda Ingram)
110 Ninth Avenue South
U.S. Court House Annex
Nashville, TN 37203

**Submittal of Chemical Quality Assurance Report for the Background Soil Investigation,
Plum Brook Ordnance Works, Sandusky, Ohio,
Contract Number DACA62-00-D-0002**

Dear Mrs. Ingram:

As required by the Scope of Work (SOW) for contract number DACA62-00-D-0002, enclosed is the Chemical Quality Assurance Report (CQAR) for the Plum Brook Ordnance Works (PBOW). DataChek prepared the CQARs. DataChek followed the requirements outlined in the USACE document EM-200-1-6 *Chemical Quality Assurance for Hazardous, Toxic and Radioactive Waste (HTRW) Projects*. The report is based on an evaluation of the groundwater data collected in August 2003.

If you have any questions or require additional information regarding this submittal, please call me at (865) 560-5271.

Sincerely,

A handwritten signature in cursive script that reads "Maureen F. McMyler".

Maureen F. McMyler
Project Chemist

Enclosure

cc: Project file

Chemical Quality Assurance Report

Soil Background

Plum Brook Ordnance Works

Sandusky, Ohio

Prepared for the Shaw Group

By

DataChek



December 1, 2003

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**Chemical Quality Assurance Report
Soil Background – August 2003
Plum Brook Ordnance Works, Sandusky, Ohio**

1.0 Executive Summary

The purpose of the Chemical Quality Assurance Report (CQAR) is to provide a comprehensive review of the quality of the chemical data associated with the soil background program for the Plum Brook Ordnance Works (PBOW). The former PBOW site is currently owned by NASA and is operated as the Plum Brook Station (PBS) of the NASA John Glenn Research Center, which is located at Lewis Field based in Cleveland, Ohio. It is located approximately 4 miles south of Sandusky, Ohio, and 59 miles west of Cleveland. The areas surrounding PBOW are mostly agricultural and residential. Public access is restricted at PBOW except during the annual deer hunting season.

The PBOW site was built in early 1941 as a manufacturing plant for 2,4,6-TNT, dinitrotoluene (DNT), and pentolite. Production of explosives began on December 16, 1941 and continued until 1945. It is estimated that more than one billion pounds of explosives were manufactured during the 4-year operating period. Decontamination of TNT, acid, pentolite, and DNT processing lines was completed in late 1945.

The data will be used to establish a background concentration for potential contaminants in the site soils. This will allow for comparisons of contaminant concentrations that may constitute unacceptable risk to human health or the environment, determine the nature and extent of source areas, and determine whether contaminant distribution is consistent with DOD activities.

The CQAR for the PBOW soil background program has been prepared using a single set of a project sample, field quality assurance (QA) sample (field duplicate) and quality control (QC) sample (field split). Samples used in the preparation of the CQAR are listed in Table 1. The analyte groups and analytical methods are provided below:

Parameter (Method)
Explosives by SW846, 8330
PAH/Semivolatile Organics by SW846 8270C
Metals by SW846 6010B, 7470A

Table 1: Samples Used in Preparation of the CQAR

LOCATION	SAMPLE NO	SAMPLE DATE	PURPOSE	SDG	ANALYTICAL LAB
PBOW	DB0003	6-Aug-03	REG	H3H080204	STL
	DB0004		FD	H3H080204	STL
	DB0005		FS	F18977	Accutest

Two laboratories provided the analysis of the project samples and the associated laboratory QA/QC used in arriving at the results. Severn Trent Services (STL), Knoxville, TN analyzed both the project sample and the field QA sample (field duplicate), and Accutest Laboratories, Orlando, Florida analyzed the field QC sample (field split).

Sensitivity: All samples were analyzed within the designated holding times and preservatives were added to the samples.

Precision: The variability between the project sample, field QA and field QC are summarized in Tables 2-4. The criteria for comparing the project samples and the QA/QC samples conforms to the levels defined in Table 5. A total of 60 comparisons for 20 different metals were made and none of the sample pairs were designated as disagreement and four (6.7%) as major disagreement. All four of the sample results with major disagreement resulted from comparing samples with detects to samples with no detects.

Accuracy: The analyte groups may contain false positives or be biased high because of method and/or trip blank contamination. In the metals, barium, lead and manganese were present in the method blank but all project and field QA sample results were >5x the blank amount and no qualifiers were required.

Completeness: No data were rejected

Comparability: All of the analytical laboratories used the same method to analyze the samples. As a result all sample data can accurately be compared and analyzed.

2.0 Review of Project Samples, Field QA Samples, & Field QC Samples

The sample data were evaluated following the logic identified in *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review* (February 1994) and *USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review* (October 1999). Blank evaluation followed *USEPA Region III Modifications to the Laboratory Data Validation Functional Guidelines for Evaluating Inorganic Analyses* (April 1993) and *Region III Modifications to National Functional Guidelines for Organic Data Review, Multi-Media, Multi-Concentration* (September 1994). Overall, the quality of the data was determined to be acceptable. Acceptable results were qualified as appropriate.

Several sample results for the organic compounds were assigned “J” qualifiers by the laboratory, which is standard practice for these methods, because they were quantitated between the method detection limit (MDL) and the reporting limit (RL). Due to the uncertainty associated with this region of quantitation, the validation reviewer retained the “J” qualifiers assigned by the laboratory to indicate an estimated quantity.

Data validation summaries (Attachment 1), which function as worksheets for the validation task, are included for each parameter in each data package. The following section highlights the key findings of the data validation for each analysis.

2.1 Analysis-Specific Data Validation Summaries

2.1.1 Explosives by SW846-8330

Overall, the data are of good quality. Data were reviewed for the following:

Holding Times/Sample Condition. Technical holding time criteria were met for all samples. Samples were acceptable as received.

Initial and Continuing Calibration. All initial and continuing calibration relative response factors (RRFs) associated with the project sample met QC criteria. No qualifiers were required.

Blanks. No contaminants were found in the associated method blanks.

Surrogate Recoveries. All surrogate recoveries were within laboratory QC limits.

Matrix Spike/Matrix Spike Duplicates (MS/MSD). The MS/MSD analyses results were within limits for all three samples. No qualifiers were required.

Laboratory Control Sample (LCS). The explosives recoveries in the LCS analyses were within the QC limits and no qualifiers were required.

Quantitation. The sample results were acceptable as reported.

2.1.2 PAH/Semivolatile Organics by SW846 8270C

Overall, the data are of good quality with the exceptions noted below. Data were reviewed for the following:

Holding Times/Sample Condition. Technical holding time criteria were met for all samples.

Initial and Continuing Calibration. All initial and continuing calibration RRFs associated with the project sample met QC criteria. No compound results were rejected.

Blanks. No compounds were detected in the method blanks. No qualifiers were required.

Surrogate Recoveries. All surrogate recoveries are within the laboratory QC limits.

Matrix Spike/Matrix Spike Duplicate (MS/MSD). The MS/MSD analyses were acceptable within QC limits.

Laboratory Control Sample (LCS). LCS analyses were performed and all results were acceptable.

Internal Standards (IS). Internal standards analyses were within the +100, -50% laboratory criteria.

Quantitation. All results were nondetects.

2.1.3 Metals (Total) by SW846 6010B; Hg by Cold Vapor 7470A

Overall, the data are of good quality and are usable as reported by the laboratory with the exceptions noted below. Data were reviewed for the following:

Holding Times/Sample Condition. Technical holding time criteria were met for all samples.

Initial and Continuing Calibrations. All initial and continuing calibrations associated with the project sample met QC criteria.

Blanks. The 5X rule for contaminants found in the associated calibration, prep, and method blanks (MB) was applied to all sample results. Barium, lead and manganese were present in the method blank for the primary and field QA samples. However, the sample results were greater than 5x the blank and no qualifiers were required.

Matrix Spike/Matrix Spike Duplicate(MS/MSD). The MS/MSD recoveries were within the QC limits.

Sample Type	Samples Affected	Analyte / Analytes	Validation Qualifier
Field QA	DB0003, DB0004	Cr, Ni	J
Field QC	DB0005	Sb	UJ

ICP Check Samples. The recoveries for the check samples were within the QC limits. No qualifiers were required.

Laboratory Control Sample (LCS). All the LCS had recoveries that met the QC limits. No qualifiers were required.

ICP Serial Dilutions. The serial dilution results were within the QC limits.

Quantitation. Results quantified between the minimum detection limit (MDL) and the reporting limit (RL), which the lab qualified as “B”, were qualified as estimated “J” unless blank contamination was present.

3.0 Review of Sample Handling

All aspects of sample handling were reviewed as part of the sample data evaluation and recorded in each analysis-specific data validation summary. All chain of custody (COC) forms are available in Attachment 2. No major deficiencies were noted in the handling of the samples. All cooler temperatures were plainly identified as within the QC limit.

4.0 Data Comparison Tables

Attachment 3 contains the complete project data set used to create the Comparison Tables. The data set lists all the appropriate samples, concentration units, detection limits and quantitation limits. The detected compounds or elements were used to compare the project sample with the field QA and field QC samples.

All the detected analyte results are shown in Tables 2 through 4. In order to compare the project sample with both the field QA and field QC, compounds or elements detected in the project sample were listed for the corresponding samples as well, whether or not detected. Comparisons of results were categorized by agreement, disagreement or major disagreement as defined in Table 5.

Data comparisons were limited to the metals analyses. Application of the comparison criteria resulted in four major disagreements (MD) and no disagreements (D). All of the major disagreements involved Be and Na where the compound was detected in the project and field samples and in the corresponding field QC sample at below the detection level (qualified as “U”). The PAH/semivolatiles and explosives had no comparisons. All compounds were nondetect in all three samples for both analytical groups.

Table 2: Data Comparison: Explosives

Location Code	Detected Analyte ¹	Project Sample Sample No/ Date Result/Qual/Code ²	Field Duplicate Sample No./Date Result/Qual/Code ²	Field Split Sample No./Date Result/Qual/Code ²	PS/FD ³	PS/FS ³	FD/FS ³
PBOW	No detected compounds	DB0003 6-Aug-03	DB0004 6-Aug-03	DB0005 6-Aug-03			

Table 3: Data Comparison: Semivolatiles

Location Code	Detected Analyte ¹	Project Sample Sample No./ Date Result/Qual/Code ²	Field Duplicate Sample No./Date Result/Qual/Code ²	Field Split Sample No./Date Result/Qual/Code ²	PS/FD ³	PS/FS ³	FD/FS ³
PBOW	No detected compounds	DB0003 6-Aug-03	DB0004 6-Aug-03	DB0005 6-Aug-03			

Table 4: Data Comparison: Total Metals

Location Code	Detected Analyte ¹	Project Sample Sample No./Date Result/Qual/Code ²	Field Duplicate Sample No./ Date Result/Qual/Code ²	Field Split Sample No./Date Result/Qual/Code ²	PS/FD ³	PS/FS ³	FD/FS ³
PBOW		DB0003 6-Aug-03	DB0004 6-Aug-03	DB0005 6-Aug-03			
	Aluminum	2940	2930	2780	A	A	A
	Arsenic	1.7	1.7	1.4	A	A	A
	Barium	12.3	12.2	10.1 J	A	A	A
	Beryllium	0.18 J	0.17 J	0.066 U	A	MD	MD
	Calcium	663	713	576	A	A	A
	Chromium	2.7 J,8a	2.6 J,8a	2.1	A	A	A
	Cobalt	1.3 J	1.3 J	0.93 J	A	A	A
	Copper	2.1 J	2.0 J	1.7 J	A	A	A
	Iron	3490	3480	3160	A	A	A
	Lead	4.7	4.5	5.5 J	A	A	A
	Magnesium	439 J	448 J	411 J	A	A	A
	Manganese	41.5	42.8	36.5	A	A	A
	Nickel	3.4 J,8a	3.4 J, 8a	2.8 J	A	A	A
	Potassium	187 J	195 J	130 J	A	A	A
	Sodium	284 J	245 J	29 U	A	MD	MD
	Selenium	0.56 U	0.55 U	0.83	A	A	A
	Thallium	30.55 J	1.1 U	0.2 U	A	A	A
	Vanadium	4.4 J	4.4 J	3.5 J	A	A	A
	Zinc	18.7	18.8	16.6	A	A	A
	Mercury	0.037 U	0.037 U	0.045 J	A	A	A

Footnotes in Tables 2, 3, 4, and 5

- 1) Nondetected analyte results are provided in the Table for the purpose of establishing the basis for reporting the level of disagreement between the project and QA/QC samples. All results are reported in ug/l.
- 2) Result/Qual/Code: The Qual notation refers to the evaluator’s qualifier added to the analytical value resulting from a review of the lab QA/QC data. See **Table 66** for qualifier definitions. See **Table 7** for a listing of data validation codes.
- 3) Agreement (A)/Disagreement (D)/major disagreement (MD)-- the level of disagreement is based on comparison criteria from **Table 5**: PS=project sample; FD=field duplicate; FS=field split.

Table 5: Criteria for Comparing Field QC and QA Sample Data

Matrix	Parameter	Disagreement	Major Disagreement
All	All	>5x difference when one result is < DL	>10x difference when one result is < DL
All	All	>3x difference when one result is < RL	>5x difference when one result is < RL
Water	All except TPH	>2x difference	>3x difference

Reference: CRREL Special Report No. 96-9, “Comparison Criteria for Environmental Chemical Analyses of Split Samples Sent to Different Laboratories – Corps of Engineers Archived Data”, Grant, C.G., Jenkins, T.F., and Mudambi, A.R., USACE Cold Regions and Environmental Research Laboratory, Hanover NH, May 1996

Table 6 : Validation Qualifiers

U	Not detected. The compound/analyte was analyzed for, but not detected above the associated reporting limit.
J	The compound/analyte was positively identified; the reported value is the estimated concentration of the constituent detected in the sample analyzed.
B	The concentration reported was detected significantly above the levels reported in the associated equipment rinse samples and/or laboratory method and trip blanks. (5X/10X Rule was applied).
R	The reported sample results are rejected due to the following: <ol style="list-style-type: none">1. Severe deficiencies in the supporting quality control data.2. Anomalies noted in the sampling and/or analysis process that could affect the validity of the reported data.3. The presence or absence of the constituent cannot be verified based on the data provided.4. To indicate not to use a particular result in the event of a reanalysis.
UJ	The compound/analyte was analyzed for, but not detected above the established reporting limit. However, review and evaluation of supporting QC data and/or sampling and analysis process have indicated that the “nondetect” may be inaccurate or imprecise. The nondetect result should be estimated.

Table 7: Data Validation Reason Codes

Reason Code	Definition
01	Sample received outside of 4+/-2 degrees Celsius
01A	Improper sample preservation
02	Holding time exceeded
02A	Extraction
02B	Analysis
03	Instrument performance – outside criteria
03A	BFB
03B	DFTPP
03C	DDT and/or Endrin % breakdown exceeds criteria
03D	Retention time windows
03E	Resolution
04	Initial calibration results outside specified criteria
04A	Compound mean RRF QC criteria not met
04B	Individual % RSD criteria not met
04C	Correlation coefficient >0.995
05	Continuing calibration results outside specified criteria
05A	Compound mean RRF QC criteria not met
05B	Compound % D QC criteria not met
06	Result qualified as a result of the 5x/10x blank correction
06A	Method or preparation blank
06B	ICB or CCB
06C	ER
06D	TB
06E	FB
07	Surrogate recoveries outside control limits
07A	Sample
07B	Associated method blank or LCS
08	MS/MSD/Duplicate results outside criteria
08A	MS and/or MSD recovery not within control limits (accuracy)
08B	% RPD outside acceptance criteria (precision)
09	Post digestion spike outside criteria (GFAA)
10	Internal standards outside specified control limits
10A	Recovery
10B	Retention time
11	Laboratory control sample recoveries outside specified limits
11A	Recovery
11B	% RPD (if run in duplicate)
12	Interference check standard
13	Serial dilution
14	Tentatively identified compounds
15	Quantitation
16	Multiple results available; alternate analysis preferred
17	Field duplicate RPD criteria is exceeded
18	Percent difference between original and second column exceeds QC criteria
19	Professional judgement was used to qualify the data
20	Pesticide clean-up checks
21	Target compound identification
22	Radiological calibration
23	Radiological quantitation
24	Reported result and/or lab qualifier revised to reflect validation findings

Attachment 1
Data Validation Summaries

SDG: H34080204 Project: Plumbrook - BKS SOILS

Method: Explosives - 8330 Matrix/No. of Samples: Soil - 3

Validation Samples: DB0003 - STL

DB0004 - STL

DB0005 - Accutest

Data Validation Report Summary

	Status Code	Comments
1. Sample Preservation, Handling, and Transport	<u>A</u>	<u></u>
2. Chain of Custody	<u>A</u>	<u></u>
3. Holding Times	<u>A</u>	<u></u>
4. GC/MS Tune/Inst Perf	<u>N/A</u>	<u></u>
5. Calibrations	<u>A</u>	<u></u>
6. Blanks	<u>A</u>	<u></u>
7. Blank Spike/LCS	<u>A</u>	<u></u>
8. Matrix Spike	<u>A</u>	<u></u>
9. Surrogates	<u>A</u>	<u></u>
10. Internal Standards	<u>N/A</u>	<u></u>
11. Compound Identification	<u>A</u>	<u></u>
12. System Performance	<u>A</u>	<u></u>
13. Field QC Samples	<u>A</u>	<u></u>
14. Overall Assessment	<u>A</u>	<u></u>

Status Codes:

A = Acceptable

R = Data Rejected

X = Data acceptable but qualified due to problems

SHAW E & I INC

Client Sample ID: DB0004

HPLC

Lot-Sample #....: H3H080204-004 Work Order #....: FVXH21AJ Matrix.....: SOLID
 Date Sampled....: 08/06/03 Date Received...: 08/08/03
 Prep Date.....: 08/12/03 Analysis Date...: 08/13/03
 Prep Batch #....: 3223497
 Dilution Factor: 1
 % Moisture.....: 9.7 Method.....: SW846 8330

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING LIMIT</u>	<u>UNITS</u>	<u>MDL</u>	<i>Res Qual</i>
HMX	ND	0.50	mg/kg	0.18	u
RDX	ND	0.50	mg/kg	0.17	
1,3,5-Trinitrobenzene	ND	0.25	mg/kg	0.090	
1,3-Dinitrobenzene	ND	0.25	mg/kg	0.030	
Tetryl	ND	0.65	mg/kg	0.38	
Nitrobenzene	ND	0.25	mg/kg	0.045	
2,4,6-Trinitrotoluene	ND	0.25	mg/kg	0.045	
4-Amino-2,6- dinitrotoluene	ND	0.25	mg/kg	0.090	
2-Amino-4,6- dinitrotoluene	ND	0.25	mg/kg	0.090	
2,6-Dinitrotoluene	ND	0.25	mg/kg	0.090	
2,4-Dinitrotoluene	ND	0.25	mg/kg	0.045	
2-Nitrotoluene	ND	0.25	mg/kg	0.14	
4-Nitrotoluene	ND	0.25	mg/kg	0.090	
3-Nitrotoluene	ND	0.25	mg/kg	0.14	
	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>			
<u>SURROGATE</u>					
1-Chloro-3-nitrobenzene	109	(74 - 121)			

Report of Analysis

Client Sample ID: DB0005 Lab Sample ID: F18977-1 Matrix: SO - Soil Method: SW846 8330A SW846 8330A Project: PBOW	Date Sampled: 08/06/03 Date Received: 08/08/03 Percent Solids: 91.0
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Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GG007405.D	1	08/20/03	NJ	08/19/03	OP8256	GGG361
Run #2							

Run #	Initial Weight	Final Volume
Run #1	2.09 g	20.0 ml
Run #2		

CAS No.	Compound	Result	RL	MDL	Units	Q	Rev Qual
2691-41-0	HMX	ND	0.48	0.096	mg/kg		u
121-82-4	RDX	ND	0.48	0.096	mg/kg		↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓
99-65-0	1,3-Dinitrobenzene	ND	0.48	0.096	mg/kg		
606-20-2	2,6-Dinitrotoluene	ND	0.48	0.12	mg/kg		
121-14-2	2,4-Dinitrotoluene	ND	0.48	0.096	mg/kg		
35572-78-2	2-amino-4,6-Dinitrotoluene	ND	0.48	0.096	mg/kg		
19406-51-0	4-amino-2,6-Dinitrotoluene	ND	0.48	0.096	mg/kg		
98-95-3	Nitrobenzene	ND	0.48	0.096	mg/kg		
88-72-2	o-Nitrotoluene	ND	0.48	0.096	mg/kg		
99-08-1	m-Nitrotoluene	ND	0.48	0.096	mg/kg		
99-99-0	p-Nitrotoluene	ND	0.48	0.096	mg/kg		
479-45-8	Tetryl	ND	0.48	0.096	mg/kg		
99-35-4	1,3,5-Trinitrobenzene	ND	0.48	0.096	mg/kg		
118-96-7	2,4,6-Trinitrotoluene	ND	0.48	0.096	mg/kg		

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
610-39-9	3,4-Dinitrotoluene	100%		63-139%

ND = Not detected RL = Reporting Limit E = Indicates value exceeds calibration range	MDL - Method Detection Limit	J = Indicates an estimated value B = Indicates analyte found in associated method blank N = Indicates presumptive evidence of a compound
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**DATA VALIDATION WORKSHEET
EXPLOSIVES AND DEGRADATION PRODUCTS BY HPLC**

Reviewer: Kitchings Date: 11/30
H34080204
 Project: Plumbrook SDG: _____ Matrix/No. Samples: S-3

I. Technical Holding Times												
A. Sample Preservation, Handling and Transport												
1. Have all samples been preserved correctly?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	N/A									
2. Have sample temperatures been kept at 4° C (+or- 2° C)	<input checked="" type="radio"/> Yes	<input type="radio"/> No	N/A									
3. Were all samples received in proper condition?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	N/A									
4. Were any qualifications required based on this information?	<input type="radio"/> Yes	<input checked="" type="radio"/> No	N/A									
Cooler @ <u>4.2</u>												
B. Chain of Custody												
1. Were all samples properly recorded on COCs?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	N/A									
2. Were correct analyses performed on samples?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	N/A									
C. Holding Times												
1. Were samples extracted and analyzed within acceptable holding times?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	N/A									
2. Were any qualifications required based on this information?	<input type="radio"/> Yes	<input checked="" type="radio"/> No	N/A									
<table style="width:100%; border:none;"> <tr> <td style="width:25%;">Sampled</td> <td style="width:25%;">Prepped</td> <td style="width:25%;">Analyzed</td> </tr> <tr> <td style="text-align:center;">8/6</td> <td style="text-align:center;">8/12</td> <td style="text-align:center;">8/13</td> </tr> <tr> <td style="text-align:center;">3/1</td> <td style="text-align:center;">8/19</td> <td style="text-align:center;">8/20</td> </tr> </table>				Sampled	Prepped	Analyzed	8/6	8/12	8/13	3/1	8/19	8/20
Sampled	Prepped	Analyzed										
8/6	8/12	8/13										
3/1	8/19	8/20										
II. Initial Calibration												
1. Were correct numbers and concentrations of standards used for initial calibration standards to establish calibration curve (i.e., water: 9 standards; soil: 7 standards)?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	N/A									
2. For sample results calculated using initial calibration, was correct standard used for calculating sample result?	<input type="radio"/> Yes	<input type="radio"/> No	<input checked="" type="radio"/> N/A									
3. Was calibration range within 25% of method range? <u>< 25%</u>	<input checked="" type="radio"/> Yes	<input type="radio"/> No	N/A									
4. Were retention Times (RTs) within acceptable RT windows?	<input type="radio"/> Yes	<input type="radio"/> No	<input checked="" type="radio"/> N/A									
Comments/Qualifications: <div style="text-align:center; margin-top: 20px;"> $\frac{8/20 @ 4.05}{< 7.6} \quad \frac{2}{< 6.2}$ </div>												

**DATA VALIDATION WORKSHEET
EXPLOSIVES AND DEGRADATION PRODUCTS BY HPLC**

Reviewer: Kitchings Date: 11/30
 Project: Plumbrook SDG: H34090204
F 18977 Matrix/No. Samples: S-3

III. Continuing Calibration			
1. Were continuing calibration samples run at the required frequency, and compared to the correct initial calibration?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	<input type="radio"/> N/A
2. Were RTs for all standard compounds in continuing calibration samples within acceptable RT window?	<input type="radio"/> Yes	<input type="radio"/> No	<input checked="" type="radio"/> N/A
3. Were continuing calibration recoveries within control limit of 75-125%?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	<input type="radio"/> N/A
4. Did laboratory reported calculations and data match raw data?	<input type="radio"/> Yes	<input type="radio"/> No	<input checked="" type="radio"/> N/A
5. Were any qualifications required based on this information?	<input type="radio"/> Yes	<input checked="" type="radio"/> No	<input type="radio"/> N/A
Comments/Qualifications: <p align="center">8/20 8:27 $\frac{1}{270}$ $\frac{2}{420}$</p>			

IV. Blanks			
1. Does data package include summary of method blank results?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	<input type="radio"/> N/A
2. Were any compounds reported in laboratory method blanks?	<input type="radio"/> Yes	<input checked="" type="radio"/> No	<input type="radio"/> N/A
3. Were method blank analyses performed at required frequency?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	<input type="radio"/> N/A
4. Were any qualifications required based on this information?	<input type="radio"/> Yes	<input checked="" type="radio"/> No	<input type="radio"/> N/A
Comments/Qualifications: <p align="center">8/13 8/20 u's u's,</p>			

V. System Monitoring Compounds (Surrogate Spikes)			
1. Were all samples spiked with correct surrogate compounds?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	<input type="radio"/> N/A
2. Were laboratory surrogate recoveries calculated and reported correctly on data forms?	<input type="radio"/> Yes	<input type="radio"/> No	<input checked="" type="radio"/> N/A
3. Were surrogate recoveries within laboratory established limits?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	<input type="radio"/> N/A
4. Were any qualifications required based on surrogate spike QC information?	<input type="radio"/> Yes	<input checked="" type="radio"/> No	<input type="radio"/> N/A
Comments/Qualifications: <p align="center">$\frac{3}{102, 109}$ $\frac{5}{100}$</p>			

**DATA VALIDATION WORKSHEET
EXPLOSIVES AND DEGRADATION PRODUCTS BY HPLC**

Reviewer: Kitchings Date: 11/30

Project: Plumbrook SDG: H 314080204
F 18977 Matrix/No. Samples: 5-3

VI. Matrix Spikes/ Matrix Spike Duplicates			
1. Were MS/MSD samples analyzed at required frequency for each ample matrix (at least 5%)?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	<input type="radio"/> N/A
2. Were MS/MSD results for recovery (+or- 40%) RPD (<30) within laboratory QC limits?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	<input type="radio"/> N/A
3. Were Samples used for MS/MSD field blanks?	<input type="radio"/> Yes	<input checked="" type="radio"/> No	<input type="radio"/> N/A
4. Were matrix spike recoveries and RPDs calculated and reported correctly?	<input type="radio"/> Yes	<input type="radio"/> No	<input checked="" type="radio"/> N/A
5. Were any qualifications required, based on results of MS/MSD samples in conjunction with other QC information?	<input type="radio"/> Yes	<input checked="" type="radio"/> No	<input type="radio"/> N/A
Comments/Qualifications: <div style="display: flex; justify-content: space-around; margin-top: 10px;"> <div style="text-align: center;">MS 96-107</div> <div style="text-align: center;">94-110</div> </div> <div style="display: flex; justify-content: space-around; margin-top: 10px;"> <div style="text-align: center;">MSD 79-110</div> <div style="text-align: center;">96-115</div> </div> <div style="display: flex; justify-content: space-around; margin-top: 10px;"> <div style="text-align: center;">RPD 0.32-6.1</div> <div style="text-align: center;">\ 4-8 \</div> </div>			

VII. Laboratory Control Sample (LCS)			
1. Were LCS samples run?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	<input type="radio"/> N/A
2. If performed, were LCS recoveries within the QC limits?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	<input type="radio"/> N/A
3. If performed, were LCS calculations performed correctly, and did laboratory reported values match raw data?	<input type="radio"/> Yes	<input type="radio"/> No	<input checked="" type="radio"/> N/A
4. Were any qualifications required based on LCS data in conjunction with other QC information?	<input type="radio"/> Yes	<input checked="" type="radio"/> No	<input type="radio"/> N/A
Comments/Qualifications: <div style="margin-top: 10px;">8/13 108-114 ✓</div> <div style="margin-top: 10px;">8/20 94-108 ✓</div>			

**DATA VALIDATION WORKSHEET
EXPLOSIVES AND DEGRADATION PRODUCTS BY HPLC**

Reviewer: Kitchings Date: 11/30
H34080204
 Project: Plumbrook SDG: _____ Matrix/No. Samples: S-3

VIII. Field QC Samples			
1. Were field blank or equipment rinsate samples associated with this SDG?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	N/A
2. Were any compounds present in any associated field blank samples?	Yes	No	N/A
3. Were any field duplicate pairs analyzed in this SDG?	<input checked="" type="radio"/> Yes	No	N/A
4. Were RPDs field duplicate pairs within acceptable limits (+ or -20%)	<input checked="" type="radio"/> Yes	No	N/A
5. Were any qualifications required based on field QC information?	Yes	<input checked="" type="radio"/> No	N/A
Comments/Qualifications: 0003 0004 u/c			
IX. Compound Identification			
1. Are relative retention times (RRTs) within acceptable RRT windows?	Yes	No	<input checked="" type="radio"/> N/A
2. Were identified compounds confirmed on second column?	Yes	No	N/A
3. Were any qualification required based on this information?	Yes	No	N/A
Comments/Qualifications: No raw data.			
X. Overall Assessment of Data			
1. Are there any specific concerns or limitations regarding the data in this SDG?	Yes	<input checked="" type="radio"/> No	N/A
Comments/Qualifications:			

SDG: H3H080204 / F18977 Project: Plumbrook - BKG SOILS

Method: Semivolatiles - PAH 8270 ..Matrix/No. of Samples: Soil - 3

Validation Samples: DB0003 - STL
DB0004 - STL
DB0005 - Accutest

Data Validation Report Summary

	Status Code	Comments
1. Sample Preservation, Handling, and Transport	<u>A</u>	<u></u>
2. Chain of Custody	<u>A</u>	<u></u>
3. Holding Times	<u>A</u>	<u></u>
4. GC/MS Tune/Inst Perf	<u>A</u>	<u></u>
5. Calibrations	<u>A</u>	<u></u>
6. Blanks	<u>A</u>	<u></u>
7. Blank Spike/LCS	<u>A</u>	<u></u>
8. Matrix Spike	<u>A</u>	<u></u>
9. Surrogates	<u>A</u>	<u></u>
10. Internal Standards	<u>A</u>	<u></u>
11. Compound Identification	<u>A</u>	<u></u>
12. System Performance	<u>A</u>	<u></u>
13. Field QC Samples	<u>A</u>	<u></u>
14. Overall Assessment	<u>A</u>	<u></u>

Status Codes:

A = Acceptable

X = Data acceptable but qualified due to problems

R = Data Rejected

Qualifications:

Significant Findings/Recommendations:

Overall Data Quality:

Acceptable as reported.

Validator's Signature:

J. Thomas Kitchiss

Date: 11/30/2003

Peer Reviewer:

[Signature]

Date: _____

SHAW E & I INC

Client Sample ID: DB0003

HPLC

Lot-Sample #...: H3H080204-003 Work Order #...: FVXHV1AH Matrix.....: SOLID
 Date Sampled...: 08/06/03 Date Received...: 08/08/03
 Prep Date.....: 08/18/03 Analysis Date...: 08/21/03
 Prep Batch #...: 3230523
 Dilution Factor: 1
 % Moisture.....: 9.9 Method.....: SW846 8310

PARAMETER	RESULT	REPORTING			MDL	Rev Qud u ↓
		LIMIT	UNITS			
Acenaphthene	ND	220	ug/kg		4.3	
Acenaphthylene	ND	220	ug/kg		13	
Anthracene	ND	22	ug/kg		2.9	
Benzo (a) anthracene	ND	22	ug/kg		5.6	
Benzo (a) pyrene	ND	22	ug/kg		2.0	
Benzo (b) fluoranthene	ND	22	ug/kg		4.3	
Benzo (ghi) perylene	ND	44	ug/kg		2.9	
Benzo (k) fluoranthene	ND	22	ug/kg		2.6	
Chrysene	ND	44	ug/kg		2.7	
Dibenzo (a, h) anthracene	ND	44	ug/kg		5.1	
Fluoranthene	ND	44	ug/kg		9.4	
Fluorene	ND	44	ug/kg		9.7	
Indeno (1, 2, 3-cd) pyrene	ND	44	ug/kg		2.6	
1-Methylnaphthalene	ND	220	ug/kg		7.8	
2-Methylnaphthalene	ND	220	ug/kg		3.7	
Naphthalene	ND	220	ug/kg		13	
Phenanthrene	ND	44	ug/kg		3.7	
Pyrene	ND	44	ug/kg		7.7	
		PERCENT	RECOVERY			
<u>SURROGATE</u>	<u>RECOVERY</u>	<u>RECOVERY</u>	<u>LIMITS</u>			
Terphenyl-d14	78		(63 - 134)			

NOTE (S) :

Results and reporting limits have been adjusted for dry weight.

SHAW E & I INC

Client Sample ID: DB0004

HPLC

Lot-Sample #...: H3H080204-004 Work Order #...: FVXH21AH Matrix.....: SOLID
 Date Sampled...: 08/06/03 Date Received...: 08/08/03
 Prep Date.....: 08/18/03 Analysis Date...: 08/21/03
 Prep Batch #...: 3230523
 Dilution Factor: 1
 % Moisture.....: 9.7 Method.....: SW846 8310

PARAMETER	RESULT	REPORTING			MDL	<i>Revised</i>
		LIMIT	UNITS			
Acenaphthene	ND	220	ug/kg	4.3	<i>u</i> ↓	
Acenaphthylene	ND	220	ug/kg	13		
Anthracene	ND	22	ug/kg	2.9		
Benzo (a) anthracene	ND	22	ug/kg	5.5		
Benzo (a) pyrene	ND	22	ug/kg	2.0		
Benzo (b) fluoranthene	ND	22	ug/kg	4.3		
Benzo (ghi) perylene	ND	44	ug/kg	2.9		
Benzo (k) fluoranthene	ND	44	ug/kg	2.5		
Chrysene	ND	44	ug/kg	2.7		
Dibenzo (a, h) anthracene	ND	44	ug/kg	5.1		
Fluoranthene	ND	44	ug/kg	9.4		
Fluorene	ND	44	ug/kg	9.6		
Indeno (1, 2, 3-cd) pyrene	ND	44	ug/kg	2.5		
1-Methylnaphthalene	ND	220	ug/kg	7.8		
2-Methylnaphthalene	ND	220	ug/kg	3.7		
Naphthalene	ND	220	ug/kg	13		
Phenanthrene	ND	44	ug/kg	3.7		
Pyrene	ND	44	ug/kg	7.6		
	PERCENT	RECOVERY				
<u>SURROGATE</u>	<u>RECOVERY</u>	<u>LIMITS</u>				
Terphenyl-d14	87	(63 - 134)				

NOTE (S) :

Results and reporting limits have been adjusted for dry weight.

Report of Analysis

Client Sample ID: DB0005	Date Sampled: 08/06/03
Lab Sample ID: F18977-1	Date Received: 08/08/03
Matrix: SO - Soil	Percent Solids: 91.0
Method: EPA 8310 SW846 3550B	
Project: PBOW	

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	EE017258.D	1	08/14/03	SM	08/13/03	OP8218	GEE726
Run #2							

Run #	Initial Weight	Final Volume
Run #1	30.1 g	5.0 ml
Run #2		

Polynuclear Aromatic Hydrocarbons

CAS No.	Compound	Result	RL	MDL	Units	Q	Rev Qual
83-32-9	Acenaphthene	ND	0.73	0.18	mg/kg		u ↓
208-96-8	Acenaphthylene	ND	0.73	0.18	mg/kg		
120-12-7	Anthracene	ND	0.37	0.18	mg/kg		
56-55-3	Benzo(a)anthracene	ND	0.37	0.091	mg/kg		
50-32-8	Benzo(a)pyrene	ND	0.073	0.018	mg/kg		
205-99-2	Benzo(b)fluoranthene	ND	0.073	0.018	mg/kg		
191-24-2	Benzo(g,h,i)perylene	ND	0.073	0.018	mg/kg		
207-08-9	Benzo(k)fluoranthene	ND	0.073	0.018	mg/kg		
218-01-9	Chrysene	ND	0.37	0.091	mg/kg		
53-70-3	Dibenzo(a,h)anthracene	ND	0.073	0.018	mg/kg		
206-44-0	Fluoranthene	ND	0.37	0.091	mg/kg		
86-73-7	Fluorene	ND	0.37	0.18	mg/kg		
193-39-5	Indeno(1,2,3-cd)pyrene	ND	0.073	0.018	mg/kg		
91-20-3	Naphthalene	ND	0.37	0.091	mg/kg		
90-12-0	1-Methylnaphthalene	ND	0.37	0.091	mg/kg		
91-57-6	2-Methylnaphthalene	ND	0.37	0.091	mg/kg		
85-01-8	Phenanthrene	ND	0.37	0.18	mg/kg		
129-00-0	Pyrene	ND	0.37	0.091	mg/kg		

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
84-15-1	o-Terphenyl	98%		38-139%
92-94-4	p-Terphenyl	102%		46-149%

ND = Not detected MDL - Method Detection Limit
 RL = Reporting Limit
 E = Indicates value exceeds calibration range

J = Indicates an estimated value
 B = Indicates analyte found in associated method blank
 N = Indicates presumptive evidence of a compound

**DATA VALIDATION WORKSHEETS
SEMIVOLATILE ORGANICS**

Reviewer: Kitchings Date: 11/30

Project: Plum Brook SDG: H34080204
F18977 Matrix/No. Samples: S-3

I. Technical Holding Times			
A. Sample Preservation, Handling and Transport			
1. Have all samples been preserved correctly?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	N/A
2. Have sample temperatures been kept at 4° C (+ or - 2 °)?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	N/A
3. Were all samples received in proper condition?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	N/A
4. Were any qualifications required based on this information?	Yes	<input checked="" type="radio"/> No	N/A
Coolers @ 4.2°C,			
B. Chain of Custody			
1. Were all samples properly recorded on COCs?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	N/A
2. Were correct analyses performed on samples?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	N/A
C. Holding Times			
1. Were samples extracted and analyzed within acceptable holding times?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	N/A
2. Were any qualifications required based on this information?	Yes	<input checked="" type="radio"/> No	N/A
SAMPLED		PREPPED	
8/6	3,4	8/18 ,	8/21
	5	8/13	8/14
ANALYZED			
II. GC/MS Instrument Performance Check			
1. Were instrument performance check samples run for each analysis period?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	N/A
2. Were ion abundance criteria met for DTFPP analysis?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	N/A
3. Do laboratory forms match raw data?	Yes	<input type="radio"/> No	<input checked="" type="radio"/> N/A
4. Were any qualifications required based on this information?	Yes	<input checked="" type="radio"/> No	N/A
Comments/Qualifications:			

**DATA VALIDATION WORKSHEETS
SEMIVOLATILE ORGANICS**

Reviewer: Kitchings Date 11/30

H3H080204

Project: Plumbrook SDG: _____ Matrix/No. Samples: S-3

III. Initial Calibration			
1. Were correct concentrations of standards used for initial calibration? Were samples analyzed within 12 hours of associated instrument performance check?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	<input type="radio"/> N/A
2. Were initial calibration RRFs for all volatile target compounds and system monitoring compounds >or = 0.05? Do recalculations for RRFs agree with reported values?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	<input type="radio"/> N/A
3. Were %RSDs < or = 30% for all volatile target compounds? Do recalculations for RSDs agree with reported values?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	<input type="radio"/> N/A
4. Were any qualifications required based on this information?	<input type="radio"/> Yes	<input checked="" type="radio"/> No	<input type="radio"/> N/A
Comments/Qualifications: <div style="text-align: center;"> <p>8/14 @ 19:01 RRFs > 0.8 19/20</p> </div>			
IV. Continuing Calibration			
1. Were continuing calibration samples run at the required frequency, and compared to the correct initial calibration?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	<input type="radio"/> N/A
2. Did calculations from raw data agree with laboratory reported values for RRF and %D?	<input type="radio"/> Yes	<input type="radio"/> No	<input checked="" type="radio"/> N/A
3. Were continuing calibration RRFs for volatile organic compounds and system monitoring compounds (surrogates) > or = 0.05?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	<input type="radio"/> N/A
4. Were %D between initial calibration RRF and the continuing calibration RRFs within + or - 25%?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	<input type="radio"/> N/A
5. Were any qualifications required based on this information?	<input type="radio"/> Yes	<input checked="" type="radio"/> No	<input type="radio"/> N/A
Comments/Qualifications: <div style="text-align: center;"> <p>CCAL 8/14 @ 22:11 2 DS < 12%</p> </div>			

**DATA VALIDATION WORKSHEETS
SEMIVOLATILE ORGANICS**

Reviewer: Kitchings Date 11/30
 Project: Plumbrook SDG: 434080204
F18977 Matrix/No. Samples: S-3

VIII. Laboratory Control Sample (LCS)			
1. Were LCS samples run at correct frequency for each matrix samples?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	<input type="radio"/> N/A
2. Were LCS calculations performed correctly, and did laboratory reported values match raw data? Were recoveries within laboratory QC limits?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	<input type="radio"/> N/A
4. Were any qualifications required based on LCS data in conjunction with other QC information?	<input type="radio"/> Yes	<input checked="" type="radio"/> No	<input type="radio"/> N/A
Comments/Qualifications: S/21 LCS 101-110 S/M 86-109			
IX. Internal Standards			
1. Were standard area counts within a factor of two (-50% to +100%) from associated calibration standard?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	<input type="radio"/> N/A
2. Were retention times of internal standard within + or - 30 seconds of retention time of associated calibration check?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	<input type="radio"/> N/A
3. Were any qualifications required based on internal standard results?	<input type="radio"/> Yes	<input checked="" type="radio"/> No	<input type="radio"/> N/A
Comments/Qualifications: .			
X. Target Compound Identification			
1. Are relative retention times (RRTs) within + or - 0.06 RRT units of standard RRT?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	<input checked="" type="radio"/> N/A
2. Do sample compound spectra meet specified criteria in relation to laboratory standard spectra?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	<input checked="" type="radio"/> N/A
3. Were all compounds accounted for on chromatogram?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	<input checked="" type="radio"/> N/A
Comments/Qualifications: No raw data - level III			

H3H080204

SDG: F 18977

Project: PLUMBROOK

Method: METALS ^{6010B}
7470 A

Matrix/No. of Samples: Soil - 3

Validation Samples: DB0003 - STL
DB0004 - STL
DB0005 - Accutest

Data Validation Report Summary

	Status Code	Comments
1. Sample Preservation, Handling, and Transport	<u>A</u>	<u></u>
2. Chain of Custody	<u>A</u>	<u></u>
3. Holding Times	<u>A</u>	<u></u>
4. Calibrations	<u>A</u>	<u></u>
5. Blanks	<u>A</u>	<u></u>
6. ICP/ICS	<u>A</u>	<u></u>
7. Blank Spike/LCS	<u>A</u>	<u></u>
8. Duplicates	<u>A</u>	<u></u>
9. Matrix Spike	<u>X</u>	<u></u>
10. Furnace Atomic Absorption QC	<u>N/A</u>	<u></u>
11. ICP Serial Dilution	<u>A</u>	<u></u>
12. Sample Result Verification	<u>A</u>	<u></u>
13. Field QC Samples	<u>A</u>	<u></u>
14. Overall Assessment	<u>X</u>	<u></u>

Status Codes:

A = Acceptable

R = Data Rejected

X = Data acceptable but qualified due to problems

Qualifications:

8* • 86 had a low m/psd in the F18977 data set and was qualified as "UJ" in sample DB0005; likewise Cr and Ni were qualified as "J" in DB0003 and DB0004.

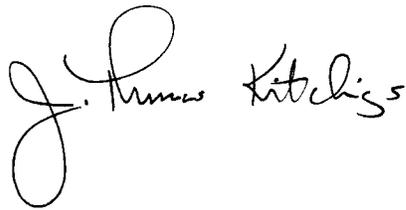
Significant Findings/Recommendations:

Overall Data Quality:

Acceptable as qualified.

Date: 11/30/2003

Validator's Signature:



Peer Reviewer:

SHAW E & I INC

Client Sample ID: DB0003

TOTAL Metals

Lot-Sample #...: H3H080204-003

Matrix.....: SOLID

Date Sampled...: 08/06/03

Date Received...: 08/08/03

% Moisture.....: 9.9

PARAMETER	RESULT	REPORTING LIMIT	UNITS ^{Raw} <i>Qual</i>	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 3224131						
Mercury	ND	0.037	mg/kg U	SW846 7471A	08/12/03	FVXHVLAF
		Dilution Factor: 1		Analysis Time...: 14:45	MDL.....: 0.011	
Prep Batch #...: 3224241						
Aluminum	2940	22.2	mg/kg	SW846 6010B	08/12-08/13/03	FVXHVLAK
		Dilution Factor: 1		Analysis Time...: 11:39	MDL.....: 3.7	
Antimony	ND	6.7	mg/kg U	SW846 6010B	08/12-08/13/03	FVXHVLAL
		Dilution Factor: 1		Analysis Time...: 11:39	MDL.....: 0.23	
Arsenic	1.7	1.1	mg/kg	SW846 6010B	08/12-08/13/03	FVXHVLAM
		Dilution Factor: 1		Analysis Time...: 11:39	MDL.....: 0.51	
Barium	12.3 J	5.6	mg/kg	SW846 6010B	08/12-08/13/03	FVXHVLAN
		Dilution Factor: 1		Analysis Time...: 11:39	MDL.....: 0.12	
Beryllium	0.18 B	0.56	mg/kg J	SW846 6010B	08/12-08/13/03	FVXHVLAP
		Dilution Factor: 1		Analysis Time...: 11:39	MDL.....: 0.022	
Cadmium	ND	0.56	mg/kg U	SW846 6010B	08/12-08/13/03	FVXHVLAQ
		Dilution Factor: 1		Analysis Time...: 11:39	MDL.....: 0.089	
Calcium	663	555	mg/kg	SW846 6010B	08/12-08/13/03	FVXHVLAR
		Dilution Factor: 1		Analysis Time...: 11:39	MDL.....: 3.6	
Chromium	2.7	1.1	mg/kg J 8a	SW846 6010B	08/12-08/13/03	FVXHVLAT
		Dilution Factor: 1		Analysis Time...: 11:39	MDL.....: 0.44	
Cobalt	1.3 B	5.6	mg/kg J	SW846 6010B	08/12-08/13/03	FVXHVLAV
		Dilution Factor: 1		Analysis Time...: 11:39	MDL.....: 0.21	
Copper	2.1 B	2.8	mg/kg J	SW846 6010B	08/12-08/13/03	FVXHVLAV
		Dilution Factor: 1		Analysis Time...: 11:39	MDL.....: 0.11	
Iron	3490	11.1	mg/kg	SW846 6010B	08/12-08/13/03	FVXHVLAW
		Dilution Factor: 1		Analysis Time...: 11:39	MDL.....: 2.7	
Lead	4.7 J	0.33	mg/kg	SW846 6010B	08/12-08/13/03	FVXHVLAX
		Dilution Factor: 1		Analysis Time...: 11:39	MDL.....: 0.14	

(Continued on next page)

SHAW E & I INC

Client Sample ID: DB0003

TOTAL Metals

Lot-Sample #...: H3H080204-003

Matrix.....: SOLID

PARAMETER	RESULT	REPORTING		METHOD	PREPARATION-	WORK
		LIMIT	UNITS		ANALYSIS DATE	ORDER #
Magnesium	439 B	555	mg/kg J	SW846 6010B	08/12-08/13/03	FVXHVI1A0
		Dilution Factor: 1		Analysis Time...: 11:39	MDL.....: 2.0	
Manganese	41.5 J	1.7	mg/kg	SW846 6010B	08/12-08/13/03	FVXHVI1A1
		Dilution Factor: 1		Analysis Time...: 11:39	MDL.....: 0.078	
Nickel	3.4 B	4.4	mg/kg J ⁸⁴	SW846 6010B	08/12-08/13/03	FVXHVI1A2
		Dilution Factor: 1		Analysis Time...: 11:39	MDL.....: 0.38	
Potassium	187 B	555	mg/kg J	SW846 6010B	08/12-08/13/03	FVXHVI1A3
		Dilution Factor: 1		Analysis Time...: 11:39	MDL.....: 22.1	
Selenium	ND	0.56	mg/kg U	SW846 6010B	08/12-08/13/03	FVXHVI1A4
		Dilution Factor: 1		Analysis Time...: 11:39	MDL.....: 0.28	
Silver	ND	1.1	mg/kg U	SW846 6010B	08/12-08/13/03	FVXHVI1A5
		Dilution Factor: 1		Analysis Time...: 11:39	MDL.....: 0.31	
Sodium	284 B	555	mg/kg J	SW846 6010B	08/12-08/13/03	FVXHVI1AA
		Dilution Factor: 1		Analysis Time...: 11:39	MDL.....: 101	
Thallium	0.55 B	1.1	mg/kg J	SW846 6010B	08/12-08/13/03	FVXHVI1AC
		Dilution Factor: 1		Analysis Time...: 11:39	MDL.....: 0.30	
Vanadium	4.4 B	5.6	mg/kg J	SW846 6010B	08/12-08/13/03	FVXHVI1AD
		Dilution Factor: 1		Analysis Time...: 11:39	MDL.....: 0.23	
Zinc	18.7	2.2	mg/kg	SW846 6010B	08/12-08/13/03	FVXHVI1AE
		Dilution Factor: 1		Analysis Time...: 11:39	MDL.....: 0.23	

NOTE(S):

Results and reporting limits have been adjusted for dry weight.

J Method blank contamination. The associated method blank contains the target analyte at a reportable level.

B Estimated result. Result is less than RL.

SHAW E & I INC

Client Sample ID: DB0004

TOTAL Metals

Lot-Sample #....: H3H080204-004

Matrix.....: SOLID

Date Sampled....: 08/06/03

Date Received...: 08/08/03

% Moisture.....: 9.7

PARAMETER	RESULT	REPORTING LIMIT	UNITS ^{Rev} _{Just}	METHOD	PREPARATION- ANALYSIS DATE	WORK ORDER #
Prep Batch #....:	3224131					
Mercury	ND	0.037	mg/kg μ	SW846 7471A	08/12/03	FVXH21AF
		Dilution Factor: 1		Analysis Time...: 14:47	MDL.....: 0.011	
Prep Batch #....:	3224241					
Aluminum	2930	22.2	mg/kg	SW846 6010B	08/12-08/13/03	FVXH21AK
		Dilution Factor: 1		Analysis Time...: 11:43	MDL.....: 3.7	
Antimony	ND	6.6	mg/kg μ	SW846 6010B	08/12-08/13/03	FVXH21AL
		Dilution Factor: 1		Analysis Time...: 11:43	MDL.....: 0.23	
Arsenic	1.7	1.1	mg/kg	SW846 6010B	08/12-08/13/03	FVXH21AM
		Dilution Factor: 1		Analysis Time...: 11:43	MDL.....: 0.51	
Barium	12.2 J	5.5	mg/kg	SW846 6010B	08/12-08/13/03	FVXH21AN
		Dilution Factor: 1		Analysis Time...: 11:43	MDL.....: 0.12	
Beryllium	0.17 B	0.55	mg/kg J	SW846 6010B	08/12-08/13/03	FVXH21AP
		Dilution Factor: 1		Analysis Time...: 11:43	MDL.....: 0.022	
Cadmium	ND	0.55	mg/kg μ	SW846 6010B	08/12-08/13/03	FVXH21AQ
		Dilution Factor: 1		Analysis Time...: 11:43	MDL.....: 0.089	
Calcium	713	554	mg/kg	SW846 6010B	08/12-08/13/03	FVXH21AR
		Dilution Factor: 1		Analysis Time...: 11:43	MDL.....: 3.5	
Chromium	2.6	1.1	mg/kg J 8a	SW846 6010B	08/12-08/13/03	FVXH21AT
		Dilution Factor: 1		Analysis Time...: 11:43	MDL.....: 0.44	
Cobalt	1.3 B	5.5	mg/kg J	SW846 6010B	08/12-08/13/03	FVXH21AU
		Dilution Factor: 1		Analysis Time...: 11:43	MDL.....: 0.21	
Copper	2.0 B	2.8	mg/kg J	SW846 6010B	08/12-08/13/03	FVXH21AV
		Dilution Factor: 1		Analysis Time...: 11:43	MDL.....: 0.11	
Iron	3480	11.1	mg/kg	SW846 6010B	08/12-08/13/03	FVXH21AW
		Dilution Factor: 1		Analysis Time...: 11:43	MDL.....: 2.7	
Lead	4.5 J	0.33	mg/kg	SW846 6010B	08/12-08/13/03	FVXH21AX
		Dilution Factor: 1		Analysis Time...: 11:43	MDL.....: 0.14	

(Continued on next page)

SHAW E & I INC

Client Sample ID: DB0004

TOTAL Metals

Lot-Sample #...: H3H080204-004

Matrix.....: SOLID

PARAMETER	RESULT	REPORTING		METHOD	PREPARATION-	WORK
		LIMIT	UNITS		ANALYSIS DATE	ORDER #
Magnesium	448 B	554	mg/kg J	SW846 6010B	08/12-08/13/03	FVXH21A0
		Dilution Factor: 1		Analysis Time...: 11:43	MDL.....: 2.0	
Manganese	42.8 J	1.7	mg/kg	SW846 6010B	08/12-08/13/03	FVXH21A1
		Dilution Factor: 1		Analysis Time...: 11:43	MDL.....: 0.078	
Nickel	3.4 B	4.4	mg/kg J & a	SW846 6010B	08/12-08/13/03	FVXH21A2
		Dilution Factor: 1		Analysis Time...: 11:43	MDL.....: 0.38	
Potassium	195 B	554	mg/kg J	SW846 6010B	08/12-08/13/03	FVXH21A3
		Dilution Factor: 1		Analysis Time...: 11:43	MDL.....: 22.0	
Selenium	ND	0.55	mg/kg U	SW846 6010B	08/12-08/13/03	FVXH21A4
		Dilution Factor: 1		Analysis Time...: 11:43	MDL.....: 0.28	
Silver	ND	1.1	mg/kg U	SW846 6010B	08/12-08/13/03	FVXH21A5
		Dilution Factor: 1		Analysis Time...: 11:43	MDL.....: 0.31	
Sodium	245 B	554	mg/kg J	SW846 6010B	08/12-08/13/03	FVXH21AA
		Dilution Factor: 1		Analysis Time...: 11:43	MDL.....: 101	
Thallium	ND	1.1	mg/kg U	SW846 6010B	08/12-08/13/03	FVXH21AC
		Dilution Factor: 1		Analysis Time...: 11:43	MDL.....: 0.30	
Vanadium	4.4 B	5.5	mg/kg J	SW846 6010B	08/12-08/13/03	FVXH21AD
		Dilution Factor: 1		Analysis Time...: 11:43	MDL.....: 0.23	
Zinc	18.8	2.2	mg/kg	SW846 6010B	08/12-08/13/03	FVXH21AE
		Dilution Factor: 1		Analysis Time...: 11:43	MDL.....: 0.23	

NOTE(S):

Results and reporting limits have been adjusted for dry weight.

J Method blank contamination. The associated method blank contains the target analyte at a reportable level.

B Estimated result. Result is less than RL.

Report of Analysis

Client Sample ID: DB0005	Date Sampled: 08/06/03
Lab Sample ID: F18977-1	Date Received: 08/08/03
Matrix: SO - Soil	Percent Solids: 91.0
Project: PBOW	

Metals Analysis

Analyte	Result	RL	MDL	Units	DF	Prep	Analyzed By	Method	Prep Method	
Aluminum	2780	22	1.5	mg/kg	1	08/20/03	08/20/03	DM	SW846 6010B	SW846 3050B
Antimony	0.41 U	6.6	0.41	mg/kg	1	08/20/03	08/20/03	DM	SW846 6010B	SW846 3050B
Arsenic	1.4	0.55	0.19	mg/kg	1	08/20/03	08/20/03	DM	SW846 6010B	SW846 3050B
Barium	10.1 B	22	0.19	mg/kg	1	08/20/03	08/20/03	DM	SW846 6010B	SW846 3050B
Beryllium	0.066 U	0.55	0.066	mg/kg	1	08/20/03	08/20/03	DM	SW846 6010B	SW846 3050B
Cadmium	0.022 U	0.44	0.022	mg/kg	1	08/20/03	08/20/03	DM	SW846 6010B	SW846 3050B
Calcium	576	550	7.4	mg/kg	1	08/20/03	08/20/03	DM	SW846 6010B	SW846 3050B
Chromium	2.1	1.1	0.11	mg/kg	1	08/20/03	08/20/03	DM	SW846 6010B	SW846 3050B
Cobalt	0.93 B	5.5	0.088	mg/kg	1	08/20/03	08/20/03	DM	SW846 6010B	SW846 3050B
Copper	1.7 B	2.7	0.15	mg/kg	1	08/20/03	08/20/03	DM	SW846 6010B	SW846 3050B
Iron	3160	11	2.4	mg/kg	1	08/20/03	08/20/03	DM	SW846 6010B	SW846 3050B
Lead	5.5 B	11	0.18	mg/kg	1	08/20/03	08/20/03	DM	SW846 6010B	SW846 3050B
Magnesium	411 B	550	4.8	mg/kg	1	08/20/03	08/20/03	DM	SW846 6010B	SW846 3050B
Manganese	36.5	1.6	0.12	mg/kg	1	08/20/03	08/20/03	DM	SW846 6010B	SW846 3050B
Mercury	0.045 B	0.085	0.0022	mg/kg	1	08/11/03	08/11/03	LIR	SW846 7471A	SW846 7471A
Nickel	2.8 B	4.4	0.11	mg/kg	1	08/20/03	08/20/03	DM	SW846 6010B	SW846 3050B
Potassium	130 B	550	15	mg/kg	1	08/20/03	08/20/03	DM	SW846 6010B	SW846 3050B
Selenium	0.83 B	11	0.22	mg/kg	1	08/20/03	08/20/03	DM	SW846 6010B	SW846 3050B
Silver	0.12 U	1.1	0.12	mg/kg	1	08/20/03	08/20/03	DM	SW846 6010B	SW846 3050B
Sodium	29 U	550	29	mg/kg	1	08/20/03	08/20/03	DM	SW846 6010B	SW846 3050B
Thallium	0.20 U	1.1	0.20	mg/kg	1	08/20/03	08/20/03	DM	SW846 6010B	SW846 3050B
Vanadium	3.5 B	5.5	0.088	mg/kg	1	08/20/03	08/20/03	DM	SW846 6010B	SW846 3050B
Zinc	16.6	2.2	0.34	mg/kg	1	08/20/03	08/20/03	DM	SW846 6010B	SW846 3050B

RL = Reporting Limit
MDL = Method Detection Limit

U = Indicates a result < MDL
B = Indicates a result >= MDL but < RL

**DATA VALIDATION WORKSHEET
METALS**

Reviewer: Kitchings

Date: 11/30

Project: Plumbrook SDG: 434080204

Matrix/No. Samples S-3

I. Sample Management			
A. Sample Preservation, Handling and Transport			
1. Have all samples been preserved with HNO ₃ to pH <2?	Yes	No	N/A
2. Have sample temperatures been kept at 4° C (+ or - 2° C)?	Yes	No	N/A
3. Were all samples received in proper condition?	Yes	No	N/A
4. Were any qualifications required based on this information?	Yes	No	N/A
Cooler @ <u>4.2°C</u>			
B. Chain of Custody			
1. Were all samples properly recorded on COCs?	Yes	No	N/A
2. Were correct analyses performed on samples?	Yes	No	N/A
C. Holding Times			
1. Were samples analyzed within acceptable holding times?	Yes	No	N/A
2. Were any qualifications required based on this information?	Yes	No	N/A
SAMPLED		PREPPED/ANALYZED	
3,4	ICP Hg	8/12 8/12	8/14
5	ICP		8/20
	Hg		8/11
II. Calibrations			
1. Were proper number of calibration standards used for each analytical instrument used?	Yes	No	N/A
2. Is the calibration correlation coefficient >or = 0.995 for each analytical instrument used?	Yes	No	N/A
3. Are initial and continuing calibration verification %R within 10% (+ or - 1%) acceptance window?	Yes	No	N/A
4. Are CRDL Standard %R within 10% (+ or - 1%) acceptance window?	Yes	No	N/A
5. Were any qualifications required based on this information?	Yes	No	N/A
Comments/Qualifications:			
Hg ICV 106.7			
ICP CCV's. ✓ ICV's. ✓			
93.5 ✓			
104.8 ✓			

**DATA VALIDATION WORKSHEET
METALS**

Reviewer: Kitchings

Date: 11/30

Project: Plumbrook SDG: A3H080204
F18977

Matrix/No. Samples S-3

III. Blanks			
1. Are any analytes reported in laboratory prep or calibration blanks above the IDL?	Yes	<input checked="" type="radio"/> No	N/A
2. Are any analytes reported as negative values in laboratory prep or calibration blanks?	Yes	<input checked="" type="radio"/> No	N/A
3. Were any qualifications required based on this information?	Yes	<input checked="" type="radio"/> No	N/A
Comments/Qualifications: <p align="center">MB's - U ICB's - U CCB's U</p>			
IV. ICP Interference Check Sample (ICS)			
1. Were ICS samples run at the beginning and end of each sample analysis run?	<input checked="" type="radio"/> Yes	No	N/A
2. Are ICS %R within 80-120% acceptable control limits?	<input checked="" type="radio"/> Yes	No	N/A
3. Were any qualifications required based on this information?	Yes	<input checked="" type="radio"/> No	N/A
Comments/Qualifications: <p align="center">ICS ↘ 89.8 107.0</p>			
V. Blank Spike/Laboratory Control Sample (LCS)			
1. Are all aqueous LCS %R within 80-120% control limits?	Yes	No	<input checked="" type="radio"/> N/A
2. Are all solid LCS %R within control limits established by EPA?	<input checked="" type="radio"/> Yes	No	N/A
3. Were any qualifications required based on this information?	Yes	<input checked="" type="radio"/> No	N/A
Comments/Qualifications: <p align="center">LCS ↘ 82.8 - 105.9</p>			

**DATA VALIDATION WORKSHEET
METALS**

Reviewer: Kitchings

Date: 11/30

Project: Plumbrook

SDG: H3 H 08 0204
F 18977

Matrix/No. Samples S-3

VI. Duplicates			
1. Were samples used for duplicate sample analysis identified as field blanks?	Yes	<input checked="" type="radio"/> No	N/A
2. For duplicate samples >5x CRDL, were RPDs within control limits of + or - 20% for water, or + or - 35% for soil?	<input checked="" type="radio"/> Yes	No	N/A
3. For duplicate samples <5x CRDL, were duplicate samples within control limit of + or - CRDL for water, or + or - 2xCRDL for soil?	<input checked="" type="radio"/> Yes	No	N/A
4. Were any qualifications required based on this information?	Yes	<input checked="" type="radio"/> No	N/A
Comments/Qualifications: <div style="text-align: center; margin-top: 10px;">✓</div>			
VII. Matrix Spike			
1. Were samples used for matrix spike sample analysis identified as field blanks?	Yes	<input checked="" type="radio"/> No	N/A
2. Were spike recoveries within 75-125% limits (limits do not apply when original sample concentration exceeds spike concentration by a factor of 4)?	<input checked="" type="radio"/> Yes	No	N/A
3. Were any qualifications required based on this information?	Yes	<input checked="" type="radio"/> No	N/A
Comments/Qualifications: 3,4 sb ms-low msb-ok. RPD-high. Cr, Ni - zero - uJ / (J) ← 5 Sb-low - low (uJ)			
VIII. ICP Serial Dilution			
1. Were %Ds for ICP serial dilution samples within 10% for analytes with concentrations greater than 50x IDL?	<input checked="" type="radio"/> Yes	No	N/A
2. Were any qualifications required based on this information?	Yes	<input checked="" type="radio"/> No	N/A
Comments/Qualifications: <div style="text-align: center; margin-top: 10px;">ok</div>			

**DATA VALIDATION WORKSHEET
METALS**

Reviewer: Kitchings

Date: 11/30

Project: Plumbrook SDG: H3H080204
F 18977

Matrix/No. Samples S-3

IX. Sample Result Qualification Not Required For Level III Data Validation			
1. Were sample results reported by laboratory supported by raw data?	Yes	No	N/A
2. Were correct calculations used to determine sample results?	Yes	No	N/A
3. Were any qualifications required based on this information?	Yes	No	N/A
Comments/Qualifications: No raw data - level <u>M</u>			
X. Field QC			
1. Were any Field Duplicates associated with this SDG?	Yes	No	N/A
a. If Yes, were RPDs acceptable (50% for water samples, 100% for soil samples)?	Yes	No	N/A
2. Were any field blanks or equipment rinsates associated with this SDG?	Yes	No	N/A
a. If yes, were any analytes reported in samples >IDL?	Yes	No	N/A
b. Were any qualifications required based on this information?	Yes	No	N/A
Comments/Qualifications:			
XI. Overall Assessment of Data			
1. Are there any specific concerns or limitations regarding the data in this SDG?	Yes	No	N/A
Comments/Qualifications:			

Attachment 2

Chain of Custody Forms

H3H 80204

REFERENCE DOCUMENT NO.: 1BCB0603 STL

ANALYSIS REQUEST AND CHAIN-OF-CUSTODY RECORD

PAGE 1 OF 2

Bill To: Greg Massingale
Shaw E&I
312 Directors Drive
Knoxville, TN 37923

Report To: Maureen McMyler
Shaw E&I
312 Directors Drive
Knoxville, TN 37923

Sample Shipment Date: 8/7/03
Laboratory Destination: STL - Knoxville
Laboratory Contact: Jamie McKinney
Project Contact/Phone: Maureen McMyler/865-690-3211
Carrier Waybill No.: 836531447472

Project Name/No: PBOW
Sample Team Member: David Kessler
Profit Center: Knoxville
Project Manager: Steve Downey
Project No.: 843656
Required Report Date: 21 Days

Sample Number	Sample Type/Description	Date/Time Collected	Container Type	Sample Volume	Pre-servative	Requested Testing Program	Cooler ID	Condition on Receipt	Disposal Record
DB0001	Soil (SS)	8/6/03 0930	1 - Amber 8 oz	8 oz	Cool	Explosives by 8330			
			1 - Amber 8 oz	8 oz	Cool	Tal Metals by 6010B/7471A		Rec'd from 3E	
			1 - Amber 8 oz	8 oz	Cool	PAH by 3540C/8310		custody seals intact	
DB0002		8/6/03 1030	1 - CWM 8 oz	8 oz	Cool	EXPLOSIVES BY 8330		1 Cooler sealed	
			1 - CWM 8 oz	8 oz	Cool	TAL METALS BY 6010B/7471A		836531447472	
			1 - CWM 8 oz	8 oz	Cool	PAH BY 3540C/8310		MPK 8-9-03	
DB0003		8/6/03 0815	1 - CWM 8 oz	8 oz	Cool	EXPLOSIVES BY 8330			
			1 - CWM 8 oz	8 oz	Cool	TAL METALS BY 6010B/7471A			
			1 - CWM 8 oz	8 oz	Cool	PAH BY 3540C/8310			
DB0004		8/6/03 0815	1 - CWM 8 oz	8 oz	Cool	EXPLOSIVES BY 8330			
			1 - CWM 8 oz	8 oz	Cool	TAL METALS BY 6010B/7471A			
			1 - CWM 8 oz	8 oz	Cool	PAH BY 3540C/8310			

Special Instructions: _____

Possible Hazard Identification: Use caution when handling.

Non-haz: Flammable: _____ Poison B: _____ Unknown: _____

Turnaround Time: _____

Normal: Rush: _____

Level of QC Required: I. _____ II. _____ III. _____

Sample Disposal: _____ Disposal by Lab: Archive: _____

Return to Client: _____

Project Specific: _____

1. Relinquished by: David Kessler Date: 8-8-03
Time: 1000

2. Relinquished by: Matthew F. Howard Date: 09.15
Time: _____

3. Relinquished by: _____ Date: _____
Time: _____

Comments: _____



Shaw E & L, Inc.

Project Name/No.: P80W

Laboratory Destination: STL - Knoxville

Sample Shipment Date: 08-07-03

REFERENCE DOCUMENT NO.: DB 020663570

H3H 060204

ANALYSIS REQUEST AND CHAIN-OF-CUSTODY RECORD

Page 2 of 2

Sample Number	Sample Type/Description	Date/Time Collected	Container Type	Sample Volume	Pre-servative	Requested Testing Program	Cooler ID	Condition on Receipt	Disposal Record
DB0006	Soil (SS)	8/6/03	1-CWM	8 OZ	COOL	EXPLOSIVES BY 8330			
		1400	1-CWM	8 OZ	COOL	TAL METALS BY 6008/7471A			
			1-CWM	8 OZ	COOL	PAH BY 3540C/8310			
DB0006-MS	Soil (SS)	8/6/03	1-CWM	8 OZ	COOL	EXPLOSIVES BY 8330			
		1400	1-CWM	8 OZ	COOL	TAL METALS BY 6008/7471A			
			1-CWM	8 OZ	COOL	PAH BY 3540C/8310			
DB0006-MSD	Soil (SS)	8/6/03	1-CWM	8 OZ	COOL	EXPLOSIVES BY 8330			
		1400	1-CWM	8 OZ	COOL	TAL METALS BY 6008/7471A			
			1-CWM	8 OZ	COOL	PAH BY 3540C/8310			
DB0007	Soil (SS)	8/6/03	1-CWM	8 OZ	COOL	EXPLOSIVES BY 8330			
		1430	1-CWM	8 OZ	COOL	TAL METALS BY 6008/7471A			
			1-CWM	8 OZ	COOL	PAH BY 3540C/8310			
DB0008	Soil (SS)	8/6/03	1-CWM	8 OZ	COOL	EXPLOSIVES BY 8330			
		1510	1-CWM	8 OZ	COOL	TAL METALS BY 6008/7471A			
			1-CWM	8 OZ	COOL	PAH BY 3540C/8310			
DB0009	Soil (SS)	8/6/03	1-CWM	8 OZ	COOL	EXPLOSIVES BY 8330			
		1600	1-CWM	8 OZ	COOL	TAL METALS BY 6008/7471A			
			1-CWM	8 OZ	COOL	PAH BY 3540C/8310			

Attachment 3

Project Data

[USER_TEST_GROUP] = EXPLOSIVES

LOCATION_CODE		PBOW H3H080204	PBOW PB044	PBOW-F19588
SAMPLE_NO		DB0003	DB0004	DB0005
SAMPLE_DATE		6-Aug-03	6-Aug-03	6-Aug-03
SAMPLE_PURPOSE		REG	FD	FS
<u>Parameter</u>	<u>Units</u> <u>Filtered</u>	<u>Result</u> <u>Qual</u>	<u>Result</u> <u>Qual</u>	<u>Result</u> <u>Qual</u>
Amino-2,6-dinitrotoluene, 4-	ug/L N	0.25 U	0.25 U	0.48 U
Amino-4,6-dinitrotoluene, 2-	ug/L N	0.25 U	0.25 U	0.48 U
Dinitrobenzene, 1,3-	ug/L N	0.25 U	0.25 U	0.48 U
Dinitrotoluene, 2,4-	ug/L N	0.25 U	0.25 U	0.48 U
Dinitrotoluene, 2,6-	ug/L N	0.25 U	0.25 U	0.48 U
HMX	ug/L N	0.50 U	0.50 U	0.48 U
Nitrobenzene	ug/L N	0.25 U	0.25 U	0.48 U
Nitrotoluene, 2-	ug/L N	0.25 U	0.25 U	0.48 U
Nitrotoluene, 3-	ug/L N	0.25 U	0.25 U	0.48 U
Nitrotoluene, 4-	ug/L N	0.25 U	0.25 U	0.48 U
RDX	ug/L N	0.50 U	0.50 U	0.48 U
Tetryl	ug/L N	0.25 U	0.25 U	0.48 U
Trinitrobenzene, 1,3,5-	ug/L N	0.25 U	0.25 U	0.48 U
Trinitrotoluene, 2,4,6-	ug/L N	0.25 U	0.25 U	0.48 U

[USER_TEST_GROUP] = PAH/SEMIVOLATILES

LOCATION_CODE	PBOW H3H080204			PBOW PB044		PBOW-F19588		
SAMPLE_NO	DB0003			DB0004		DB0005		
SAMPLE_DATE	6-Aug-03			6-Aug-03		6-Aug-03		
SAMPLE_PURPOSE	REG			FD		FS		
<u>Parameter</u>	<u>Units</u>	<u>Filtered</u>	<u>Result</u>	<u>Qual</u>	<u>Result</u>	<u>Qual</u>	<u>Result</u>	<u>Qual</u>
Acenaphthene	ug/L	N	220	U	220	U	0.73	U
Acenaphthylene	ug/L	N	220	U	220	U	0.73	U
Anthracene	ug/L	N	22	U	22	U	0.37	U
Benzo(a)anthracene	ug/L	N	22	U	22	U	0.37	U
Benzo(a)pyrene	ug/L	N	22	U	22	U	0.073	U
Benzo(b)fluoranthene	ug/L	N	22	U	22	U	0.073	U
Benzo(ghi)perylene	ug/L	N	44	U	44	U	0.073	U
Benzo(k)fluoranthene	ug/L	N	22	U	22	U	0.073	U
Chrysene	ug/L	N	44	U	44	U	0.37	U
Dibenz(a,h)anthracene	ug/L	N	44	U	44	U	0.073	U
Fluoranthene	ug/L	N	44	U	44	U	0.37	U
Fluorene	ug/L	N	44	U	44	U	0.37	U
Indeno(1,2,3-cd)pyrene	ug/L	N	44	U	44	U	0.073	U
Methylnaphthalene, 1-	ug/L	N	220	U	220	U	0.37	U
Methylnaphthalene, 1-	ug/L	N	220	U	220	U	0.37	U
Naphthalene	ug/L	N	220	U	220	U	0.37	U
Phenanthrene	ug/L	N	44	U	44	U	0.37	U
Pyrene	ug/L	N	44	U	44	U	0.37	U

[USER_TEST_GROUP] = METALS

LOCATION_CODE				PBOW H3H080204	PBOW PB044
SAMPLE_NO				DB0003	DB0004
SAMPLE_DATE				6-Aug-03	6-Aug-03
SAMPLE_PURPOSE			REG	FD	FS
<u>Parameter</u>	<u>Units</u>	<u>Filtered</u>	<u>Result Qual</u>	<u>Result Qual</u>	<u>Result Qual</u>
Aluminum	ug/L	N	2940	2930	2780
Antimony	ug/L	N	6.7 U	6.6 U	0.41 U
Arsenic	ug/L	N	1.7	1.7	1.4
Barium	ug/L	N	12.3 J	12.2 J	10.1 B
Beryllium	ug/L	N	0.18 B	0.17 B	0.66 U
Cadmium	ug/L	N	0.56 U	0.55 U	0.022 U
Calcium	ug/L	N	563	713	576
Chromium	ug/L	N	2.7	2.6	2.1
Cobalt	ug/L	N	1.3 B	1.3 B	0.93 B
Copper	ug/L	N	2.1 B	2.0 B	1.7 B
Iron	ug/L	N	3490	3480	3160
Lead	ug/L	N	4.7 J	4.5 J	5.5 B
Magnesium	ug/L	N	439 B	448 B	411 B
Manganese	ug/L	N	41.5 J	42.8 J	36.5
Mercury	ug/L	N	0.037 U	0.037 U	0.045 B
Nickel	ug/L	N	3.4 B	3.4 B	2.8 B
Potassium	ug/L	N	187 B	195 B	130 B
Selenium	ug/L	N	0.56 U	0.55 U	0.83 B
Silver	ug/L	N	1.1 U	1.1 U	0.12 U
Sodium	ug/L	N	284 B	245 B	294
Thallium	ug/L	N	4.4 B	4.4 B	3.5 B
Vanadium	ug/L	N	50 U	50 U	0.9 U
Zinc	ug/L	N	18.7	18.8	16.6